

CLAIMS

1. A method of measuring the size of an area within a body, comprising:
bringing at least one position sensor to each of a plurality of points in the area; determining position coordinates of the plurality of points, using the sensor; and calculating distances between the plurality of points.
2. A method as in claim 1, wherein bringing the at least one sensor to the plurality of points comprises bringing the distal end of a probe with the at least one sensor mounted thereon into contact with each of the plurality of points.
3. A method as in claim 2, wherein bringing the distal end into contact with each of the plurality of points comprises passing the distal end over a surface adjacent the area.
4. A method as in claim 2, wherein bringing the at least one sensor to the plurality of points comprises bringing the at least one sensor to a plurality of points on one or more pieces of a fractured bone.
5. A method as in any of claims 1-4, and comprising constructing a geometrical map of the plurality of points.
6. A method as in any of claims 1-4, and comprising calculating a volume associated with the area.
7. A method as in any of claims 1-4, and comprising identifying a region of the area in which there is less than a predetermined density of determined points, and prompting a user to bring a sensor to the region to determine coordinates of additional points.
8. A method as in any of claims 1-4, wherein the area is in motion, and the method comprises:

associating at least one reference sensor with the area, so that the reference sensor moves with the area;

determining the position of the reference sensor when the position of a point is determined; and

5 comparing the positions of the plurality of points to the position of the reference sensor, so as to transform the positions to a substantially stationary frame of reference.

10 9. A method as in any of claims 1-4, and comprising measuring a physiological parameter at the plurality of points, indicative of whether the point belongs to the area to be measured.

10. A method of aligning pieces of a fractured bone, comprising:

uniquely associating an anchor point with each of the pieces;

15 determining for each piece coordinates of a plurality of points, which are descriptive of the shape and position of the piece relative to the anchor point; moving the pieces so as to align the bone based on the shapes and positions of the pieces;

20 repeatedly determining coordinates of the anchor points while moving the pieces; and updating position information regarding the pieces, based on the coordinates of the anchor points, for guidance in moving the pieces.

25 11. A method as in claim 10, and comprising notifying a user when the distance between two pieces is smaller than a predetermined distance.

12. A method as in claim 10, wherein updating the position information comprises calculating the volume of an area between two pieces.

30 13. A method as in any of claims 10-12, and comprising:

producing an image of the pieces; and

updating the image based on the updated position information.

14. A method as in any of claims 10-12, and comprising producing a model of a volume between two pieces.

15. Apparatus for intrabody measurement of an area within a body, comprising:

5 a probe for insertion into the area;

a position sensor mounted on the probe;

a position determining system, which determines position coordinates of the sensor at a plurality of points adjacent the area; and

10 calculating circuitry, which calculates distances between the plurality of points.

16. Apparatus as in claim 15, and comprising a screen for displaying a geometrical map of the plurality of points based on the coordinates.

15 17. Apparatus as in any of claims 15-16, and comprising a modeling machine, coupled to the calculating circuitry, which produces a model of the area responsive thereto.

18. Apparatus as in any of claims 15-16, wherein the circuitry calculates a density of the plurality of points and signals a user as to areas in which the density is below a predetermined limit.

19. Apparatus as in any of claims 15-16, wherein the area is in motion, and the apparatus comprises:

25 a reference catheter, including a reference sensor, wherein the position determining system determines position coordinates of the reference sensor when determining the coordinates of the plurality of points,

30 wherein the calculating circuitry compares the coordinates of the plurality of points to the coordinates of the reference sensor, so as to transform the coordinates of the points to an inert frame of reference.

20. Apparatus for aligning pieces of a fractured bone, comprising:

a plurality of bone position sensors, which are connected to corresponding pieces;

a position determining system for determining positions of the sensors;

a probe, including a probe position sensor, which is passed over a plurality of points on the surface of one or more of the pieces, wherein the position determining system determines coordinates of the plurality of points, representative of the shapes of the pieces; and

calculating circuitry, which determines and updates the coordinates of the plurality of points on the pieces, responsive to movements of the bone position sensors.

21. The apparatus of claim 20, and comprising an imaging device for producing an image of the pieces, wherein the coordinates of the plurality of points are registered with the image.

22. Apparatus for aligning pieces of a fractured bone, comprising:

a plurality of position sensors, which are fixed to corresponding ones of the pieces;

an imaging device, which produces an image of the pieces;

a position determining system, which determines position coordinates of the sensors; and

calculating circuitry, which associates each piece seen in the image with its respective position sensor and updates the positions of the pieces in the image, responsive to changes in the coordinates of the sensors.

23. Apparatus as in any of claims 21-22, wherein the circuitry produces a geometrical map, based on the coordinates, which is displayed along with the images of the fractures.

24. Apparatus as in any of claims 21-22, wherein the calculating circuitry calculates distances between pieces.